

## CLAIMS

[c1] 1. A method of effecting handoff of a mobile station from a first base station in a first cellular communications system controlled by a first mobile switching control station to a second base station in a second, different cellular system controlled by a second mobile switching control station, the method comprising:

generating at the second cellular communication system an authentication code as the result of applying an algorithm to a private key assigned to the mobile station for the second cellular communications system and a random number generated by the second cellular communications system;

generating at the first cellular communication system an authentication code as the result of applying an algorithm to the private key and the random number;

transmitting the authentication code generated at the first cellular communication system to a mobile station in a data packet;

transmitting from the mobile station to the second cellular communication system the authentication code generated at the first cellular communication system; and

comparing the authentication code generated at the first cellular communications system with the authentication code generated at the second cellular communications system.

[c2] 2. The method as claimed in claim 1, wherein:  
the first cellular communications system comprises a CDMA system; and  
the data packet comprises an ADDS message.

[c3] 3. The method as claimed in claim 1, wherein:  
the data packet comprises an instruction to the mobile station to remove the authentication code from the data packet; and  
the method further comprises removing the authentication code from the data packet at the mobile station.

[c4] 4. The method as claimed in claim 3, wherein the authentication code is transmitted to the second cellular communication system in a different data packet.

[c5] 5. The method as claimed in claim 4, wherein the second cellular communications system comprises a GSM system.

[c6] 6. The method as claimed in claim 1, wherein the first cellular communications system comprises a first base station controlled by a first mobile switching control station and the second cellular communications system comprises a second base station controlled by a second mobile switching control station, the method comprising:

measuring at the mobile station a parameter of a signal transmitted by said first base station;

measuring at the mobile station a parameter of a signal transmitted by said second base station;

communicating a signal quality message from the mobile station via the first base station to said first mobile switching control station, when the parameters reach a predetermined condition;

generating at the first mobile switching control station information for a channel request message for the second mobile switching control station;

communicating the information from said first mobile switching control station to said mobile station;

generating at the mobile station from the information from the first mobile switching control station a channel request message for the second mobile switching control station; and

communicating the channel request message from the mobile station to the second mobile switching control station.

[c7] 7. The method as claimed in claim 6, further comprising generating at the second mobile switching control station channel information identifying a channel in the second communications system for the mobile station.

[c8] 8. The method as claimed in claim 7, further comprising establishing communication between said mobile unit and said second base station in the identified channel.

- [c9] 9. The method as claimed in claim 8, further comprising discontinuing communication between said mobile unit and said first base station.
- [c10] 10. The method as claimed in claim 6, wherein said parameter corresponds to signal strength.
- [c11] 11. A mobile station comprising:  
a first transceiver chain operable to receive and transmit signals with a first base station in a first cellular communications system;  
a second transceiver chain operable to receive and transmit signals with a second base station in a second cellular communications system; and  
a controller for:  
receiving a random number from the second cellular communications system;  
transmitting the random number to the first cellular communications system;  
receiving an authentication code generated at the first cellular communication system as the result of applying an algorithm to a private key assigned to the mobile station for the second cellular communications system and the random number generated by the second cellular communications system;  
transmitting the authentication code generated at the first cellular communication system to the second cellular communications system in a data packet; and  
receiving a signal from the second cellular communications system representing the result of comparing the authentication code generated at the first cellular communications system with the authentication code generated at the second cellular communications system.
- [c12] 12. The mobile station as claimed in claim 11, wherein the data packet comprises an ADDS message.
- [c13] 13. The mobile station as claimed in claim 11, wherein:  
the data packet comprises an instruction to the mobile station to remove the authentication code from the data packet; and  
the controller is arranged to remove the authentication code from the data packet.

[c14] 14. The mobile station as claimed in claim 11, wherein the controller is arranged to transmit the data to the second cellular communication system in a different data packet.

[c15] 15. The mobile station as claimed in claim 11, further comprising:  
means for measuring a parameter of a signal transmitted by said first base station;  
means for measuring a parameter of a signal transmitted by said second base station;  
means for communicating a signal quality message from the mobile station via the first base station to said first cellular communications system, when the parameters reach a predetermined condition;  
means for receiving from the first base station information for a channel request message for the second cellular communications system;  
means for generating from the information from the first base station a channel request message for the second cellular communications system; and  
means for communicating the channel request message to the second mobile switching control station.

[c16] 16. The mobile station as claimed in claim 15, wherein the controller is further for receiving from said second base station channel information identifying a channel in the second communications system for the mobile station.

[c17] 17. The mobile station as claimed in claim 16, wherein the controller is arranged to respond to the channel information by establishing communication between said mobile unit and said second base station in the identified channel.

[c18] 18. The mobile station as claimed in claim 17, wherein the controller is arranged to respond to the channel information by discontinuing communication between said mobile unit and said first base station.

[c19] 19. The mobile station as claimed in claim 15, wherein said parameter corresponds to signal strength.

[c20] 20. The mobile station as claimed in claim 15, wherein said first cellular communications system is a CDMA system.

[c21] 21. The mobile station as claimed in claim 20, wherein said second cellular communications system is a GSM system.

[c22] 22. An apparatus for affecting handoff of a mobile station from a first base station in a first cellular communications system controlled by a first mobile switching control station to a second base station in a second, different cellular system controlled by a second mobile switching control station, the method comprising:

means for generating at the second cellular communication system an authentication code as the result of applying an algorithm to a private key assigned to the mobile station for the second cellular communications system and a random number generated by the second cellular communications system;

means for generating at the first cellular communication system an authentication code as the result of applying an algorithm to the private key and the random number;

means for transmitting the authentication code generated at the first cellular communication system to a mobile station in a data packet;

means for transmitting from the mobile station to the second cellular communication system the authentication code generated at the first cellular communication system; and

means for comparing the authentication code generated at the first cellular communications system with the authentication code generated at the second cellular communications system.

[c23] 23. The apparatus as claimed in claim 22, wherein:  
the first cellular communications system comprises a CDMA system; and  
the data packet comprises an ADDS message.

[c24] 24. The apparatus as claimed in claim 22, wherein:  
the data packet comprises an instruction to the mobile station to remove the authentication code from the data packet; and

the apparatus further comprises means for removing the authentication code from the data packet at the mobile station.

[c25] 25. The method as claimed in claim 24, wherein the authentication code is transmitted to the second cellular communication system in a different data packet.

[c26] 26. The method as claimed in claim 25, wherein the second cellular communications system comprises a GSM system.

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